

**Carl Moyer Program Advisory: 06-003****2005 Carl Moyer Program Guidelines – Revised Emission Factors for Medium Heavy-Duty and Large Spark Ignited Equipment***This page updated September 25, 2006*

On November 17, 2005, the Air Resources Board (ARB) approved revisions to the Carl Moyer Program Guidelines. The ARB staff issued the approved revised 2005 Guidelines on January 6, 2006. Advisories are subsequently issued as necessary to clarify or modify details within the approved Guidelines.

This advisory corrects errors in the tables describing the emission factors for medium heavy-duty engines and large spark ignited (LSI) engines. This advisory also provides emission factors for LSI engines that are certified to optional standards and for LSI retrofits.

The following table replaces Table B-4 in Appendix B.

**Revised Table B-4**  
**Medium Heavy-Duty Vehicles 14,001-33,000 lbs GVWR**  
**NOx, ROG, and PM10 Emission Factors**  
**(g/mile)<sup>(a)</sup>**

Model Year	NOx	ROG	PM10
Pre-1984	17.21	0.29	0.792
1984 – 1986	16.65	0.29	0.720
1987 – 1990	14.60	0.18	0.504
1991 – 1993	12.18	0.16	0.288
1994 – 1997	10.70	0.10	0.216
1998 – 2002	9.77	0.08	0.144
2003	5.39	0.08	0.216
2004 – 2006	5.12	0.08	0.216
2007-2009	2.79	0.05	0.024
2010+	0.51	0.02	0.024

a - Emission factors were converted using the **ultra low-sulfur diesel fuel** correction factors listed in table B-24.

The following table replaces Table B-14a in Appendix B.

**Revised Table B-14a**  
**Emission Factors for Off-Road LSI Engines by Model Year**  
**(g/bhp-hr)**

<b>Horsepower</b>	<b>Fuel</b>	<b>Model Year</b>	<b>NOx</b>	<b>ROG</b>	<b>PM10</b>
25 – 49	Gasoline	Uncontrolled – pre-2004	8.01	3.81	0.060
		Controlled 2001-2006	1.33	0.72	0.060
		Controlled 2007-2009	0.89	0.48	0.060
		Controlled 2010+	0.27	0.14	0.060
	Alt Fuel	Uncontrolled – pre-2004	13.00	0.90	0.060
		Controlled 2001-2006	1.95	0.09	0.060
		Controlled 2007-2009	1.30	0.06	0.060
		Controlled 2010+	0.39	0.02	0.060
50 – 120	Gasoline	Uncontrolled – pre-2004	11.84	2.66	0.060
		Controlled 2001-2006	1.78	0.26	0.060
		Controlled 2007-2009	1.19	0.18	0.060
		Controlled 2010+	0.36	0.05	0.060
	Alt Fuel	Uncontrolled – pre-2004	10.51	1.02	0.060
		Controlled 2001-2006	1.58	0.11	0.060
		Controlled 2007-2009	1.05	0.07	0.060
		Controlled 2010+	0.32	0.02	0.060
>120	Gasoline	Uncontrolled – pre-2004	12.94	1.63	0.060
		Controlled 2001-2006	1.94	0.16	0.060
		Controlled 2007-2009	1.29	0.11	0.060
		Controlled 2010+	0.39	0.03	0.060
	Alt Fuel	Uncontrolled – pre-2004	10.51	0.90	0.060
		Controlled 2001-2006	1.58	0.09	0.060
		Controlled 2007-2009	1.05	0.06	0.060
		Controlled 2010+	0.32	0.02	0.060

The following Table B-14c is added in Appendix B.

**Table B-14c**  
**Emission Factors for Off-Road LSI Engines Certified to Optional Standards**  
**(g/bhp-hr)**

<b>Horsepower</b>	<b>Fuel</b>	<b>Optional Standard</b>	<b>NOx</b>	<b>ROG</b>	<b>PM10</b>
25-50	Gasoline	1.50	0.67	0.36	0.060
		1.00	0.44	0.24	0.060
		0.60	0.27	0.14	0.060
		0.40	0.18	0.10	0.060
		0.20	0.09	0.05	0.060
		0.10	0.04	0.02	0.060
	Alt Fuel	1.50	0.98	0.05	0.060
		1.00	0.65	0.03	0.060
		0.60	0.39	0.02	0.060
		0.40	0.26	0.01	0.060
		0.20	0.13	0.01	0.060
		0.10	0.07	0.00	0.060
50-120	Gasoline	1.50	0.89	0.13	0.060
		1.00	0.59	0.09	0.060
		0.60	0.36	0.05	0.060
		0.40	0.24	0.04	0.060
		0.20	0.12	0.02	0.060
		0.10	0.06	0.01	0.060
	Alt Fuel	1.50	0.79	0.05	0.060
		1.00	0.53	0.03	0.060
		0.60	0.32	0.02	0.060
		0.40	0.21	0.01	0.060
		0.20	0.11	0.01	0.060
		0.10	0.05	0.00	0.060
>120	Gasoline	1.50	0.97	0.08	0.060
		1.00	0.65	0.05	0.060
		0.60	0.39	0.03	0.060
		0.40	0.26	0.02	0.060
		0.20	0.13	0.01	0.060
		0.10	0.06	0.01	0.060
	Alt Fuel	1.50	0.79	0.05	0.060
		1.00	0.53	0.03	0.060
		0.60	0.32	0.02	0.060
		0.40	0.21	0.01	0.060
		0.20	0.11	0.01	0.060
		0.10	0.05	0.00	0.060

## **Calculating Retrofit Emission Reductions.**

Manufacturers of LSI retrofit systems may verify to a percent emission reduction or absolute emissions. If a retrofit system is verified to a percent reduction, the emission factors will be that verified percent of the appropriate emissions factors in Table B-14a. If a retrofit system is verified to an absolute emission number, use Table B-14d for the emission factors.

The following Table B-14d is added in Appendix B.

**Table B-14d**  
**Emission Factors for Off-Road LSI Engine Retrofits**  
**Verified to Absolute Emission Number**  
**(g/bhp-hr)**

	<b>Level 3a or 3b any horsepower</b>	<b>NOx</b>	<b>ROG</b>	<b>PM10</b>
<b>Gasoline</b>	3.0 g/bhp-hr	1.78	0.26	0.060
	2.5 g/bhp-hr	1.48	0.22	0.060
	2.0 g/bhp-hr	1.19	0.18	0.060
	1.5 g/bhp-hr	0.89	0.13	0.060
	1.0 g/bhp-hr	0.59	0.09	0.060
	0.6 g/bhp-hr	0.36	0.05	0.060
	0.5 g/bhp-hr	0.30	0.04	0.060
<b>Alt Fuel</b>	3.0 g/bhp-hr	1.58	0.10	0.060
	2.5 g/bhp-hr	1.32	0.09	0.060
	2.0 g/bhp-hr	1.05	0.07	0.060
	1.5 g/bhp-hr	0.79	0.05	0.060
	1.0 g/bhp-hr	0.53	0.03	0.060
	0.6 g/bhp-hr	0.32	0.02	0.060
	0.5 g/bhp-hr	0.26	0.02	0.060